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Perceived Financial Barriers and the Start-up Decision:
An Econometric Analysis of Gender Differences Using GEM Data

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ABSTRACT

Although accessing finance is key to the foundation of any business, particular concerns have been expressed about the ability of UK women-owned firms to obtain external finance. In this paper we use an econometric approach to explore the effect of perceptions of financial barriers to start-up on the start-up decision itself. Our analysis is based on the Global Entrepreneurship Monitor (GEM) UK 2004 database. Standardising for a range of individual characteristics, we find that women are around 7.4 per cent more likely to perceive financial barriers to business start-up than men. As perceptions of financial barriers are linked negatively to the start-up decision, stronger perceptions of financial barriers among women are having a disproportionate effect on women's start-up decisions. However, being female also has an additional negative effect on the start-up decision, not linked to financial barriers. Policy responses, therefore, need to take into account the demand-side with the aim of countering the more negative perceptions of start-up finance among potential women entrepreneurs. Mentoring and confidence building programmes are obvious possibilities. We also find support for the value of university and college-based work experience programmes.

KEYWORDS: Finance; entrepreneurship; start-up; SME; gender; women.

Perceived Financial Barriers and the Start-up Decision

An Econometric Analysis of Gender Differences Using GEM Data

1. Introduction

The availability of finance for business start-up has attracted much attention over recent years, and stimulated the development of a number of policy initiatives in the UK. A particular focus of recent initiatives has been to try to support women's enterprise given consistent evidence of lower levels of involvement in enterprise among UK women (Harding, 2004). Previous research in this area has, however, emphasised the complexity of the issues relating to business finance and, particularly, the difficulty of trying to isolate and characterise any specific gender effects. Is it the case, for example, that lending institutions discriminate either deliberately or unwittingly against entrepreneurs who are women? Or, are women entrepreneurs simply more reluctant to seek business finance due to their socio-economic situation or prior experience of financial institutions (Kon and Storey, 2003; Freel et al., 2007)?

In this study we use an econometric approach to analyse the impact of gender differences in individuals' perceptions of difficulties in accessing finance on the start-up decision. Our analysis is based on the Global Entrepreneurship Monitor 2004 data for the UK.¹ There are three main research questions. First, how important is gender as a factor in shaping individuals' perceptions of the difficulty of obtaining finance for business start-up? Secondly, how important are any such perceptions in influencing the start-up decision? And, third, does the relationship between individuals' perceptions of financial barriers and the start-up decision differ between men and women? It may be, for example, that UK women perceive greater difficulty in accessing finance for business start-up than men, but this is having no significant influence on start-up decisions. Conversely, if, as we anticipate from previous studies, access to finance is a key element of business start-up, the fact that individual women perceive that obtaining finance is likely to be difficult may have a significant negative effect on their start-up decisions. Our objective is to explore whether the richness of the GEM database allows us to shed additional light on the relationship between gender, perceptions of financial constraints and the start-up decision².

¹ A detailed description of the full range of UK GEM 2004 Survey results is available in Harding (2004).

² A number of GEM Global Reports have explored the issue of women's entrepreneurship. For example, Allen et al. (2008) highlights global trends in women's business ownership, emphasising that the social context and general economic conditions within a country play a major role in the level of start-ups by women.

Our study complements the large existing literature on the role of access to finance in shaping business start-up, particularly women's business start-up. The value added in our analysis arises from two main sources. First, by concentrating on 'perceived' difficulties in obtaining finance, rather than on the actual difficulties individuals experience in accessing start-up finance ex post, we focus attention on the start-up decision itself, and its relationship to individuals' perceptions of their business environment. Second, our econometric approach – and the large sample provided by the GEM database – allows us to quantify the linkages between perceived barriers and the start-up decision, and to identify any gender-specific elements in these relationships. This latter point is potentially important in terms of its contribution to effective policy design and development.

The remainder of the paper is organised as follows. Section Two provides a brief overview of previous studies relating to the role of gender in shaping individuals' access to business finance and specifies our hypotheses. Section Three introduces the UK GEM 2004 database and our empirical methodology. Section Four then examines gender differentials in individuals' perceptions of financial barriers to business start-up, and Section Five focuses on the impact of these perceived financial barriers on start-up itself. Section Six draws the results of the study together and suggests some possible policy implications and directions for future research.

2. Literature and Hypotheses

The broad context for our study is set by the relatively low representation of women in different enterprise activities in the UK. The UK Global Entrepreneurship Monitor Reports, for example, consistently suggest that the Total Entrepreneurial Activity (TEA) rate of women is less than half that of men (e.g. Harding, 2004 found it to be 46 per cent of men's TEA rate). Similarly, whilst around 25 per cent of company directors in the UK are women, only 10 per cent of UK firms have a majority of female directors, a ratio which falls to 0.4 per cent amongst larger organisations (Martin et al., 2008). In terms of the management literature, the gendered processes which disadvantage or subordinate women in managerial roles have also been widely discussed since Kanter (1977). Davidson (1992), Tanton (1994) and more recently Lindgren and Packendorff (2006) have explored and reported on the shifting, but persistent female subordination within managerial careers. Academic discussion of the relationship between gender and entrepreneurship is more recent, with Holmquist and Sundin (1989, p. 1) commenting that, 'entrepreneurial theories are made by men, for men and

about men'. Ahl (2006) argues a similar point, emphasising that entrepreneurial discourse is fundamentally masculine, effectively devaluing the manner in which women 'do' business ownership. However, whilst the interpretation of women's achievements as business owners continues to be debated, there is relatively broad agreement that the potential contribution of women's enterprise is currently constrained (Rosa et al., 1996; Marlow, 1997; Carter and Shaw, 2006; Watson, 2002; Ahl, 2002; Langowitz and Minniti, 2007). Different studies implicate a range of influences on the relationship between gender and enterprise, although access to finance is a consistent theme. Marlow and Watson (2006), for example, argue that, 'female-owned enterprises are more likely to be under-capitalised in a variety of forms from the outset, locate in crowded sectors and so under perform over time.' Similarly, Warren-Smith and Jackson (2004) comment that, 'systems of finance and advice are also firmly oriented towards [men], leaving women to face a range of barriers when engaging with self-employment'. There is, therefore, a general feeling that women may be disadvantaged in their ability to raise start-up finance (Schwartz, 1976; Carter and Cannon, 1992; Johnson and Storey, 1993; Koper, 1993; Van Auken et al., 1993; Carter and Rosa, 1998)³.

An important strand in this debate stresses that the objectives of enterprising men and women may be different, and that their initial endowments of social and material capital may vary. Orser et al. (2006), for example, found lower levels of human and social capital in women-owned firms, and that women had less propensity to seek finance than men because they reported that they did not 'need' the finance, while Heilbrunn (2004) specifically found that, 'women's ventures are smaller, service-oriented and 'cheaper' to finance.' Carter and Shaw (2006: 44) suggest the potential role of gender differentials in human and social capital in shaping individuals' access to entrepreneurial finance. Lack of business or managerial experience may also differentially constrain women's access to finance, an effect exacerbated by men's broader social and business networks (Carter et al., 2003; Carter and Shaw, 2006; Manolova et al., 2006; Heilbrunn, 2004). Madill et al. (2006) make a related point, finding, 'a significant gender difference in the length of lender-borrower relationships. Even when controlling for age of the firm, the study showed that male SME owners have significantly longer relationships with lenders – suggesting that male entrepreneurs may benefit more from relationships with their lenders than do female entrepreneurs.' These demand-side effects on

³ Fraser (2005, p. 18) in his analysis of the UK Survey of SME Finances emphasises another gender related issue, noting that: "female-owned businesses pay significantly higher margins on term loans than male-owned businesses (2.9 versus 1.9 percentage points over Base)".

access to finance may be reinforced by supply-side influences, with Blake (2006) finding evidence of both gender and spatial variations in lending due to the decisions of lending officers. More widely, there is a general perception that ‘women owners were apparently more likely to reply that they expected that they would be turned down, the difference is not statistically significant’ (Orser et al., 2006: 658). This could be the result of either deliberate discrimination (Hisrich and Brush, 1986) or unconscious discrimination by financiers (Ennew and McKechnie, 1998; Carter et al., 2007). This suggests our first hypothesis:

Hypothesis 1: Perceived Finance Barriers to Start-up

All else being equal, women are more likely to perceive barriers to accessing finance for business start-up than men.

Individuals perceiving financial barriers to business start-up may, of course, adopt a number of strategies. First, they might be discouraged from seeking finance as Kon and Storey (2003) suggest, because of a belief that their application will be rejected. In this scenario, if the perception of financial barriers is more common among women, a more significant proportion of women may become ‘discouraged borrowers’, disproportionately reducing female start-up rates. The evidence on this point is mixed, however; Freel et al. (2007) found little evidence that gender was an important factor in the characteristics of discouraged borrowers, while Fraser (2007) suggests that ethnicity may play a more important role. Hill et al. (2006: 177-178), however, found more support for the discouraged borrower effect among women in Northern Ireland, with women reporting that the banks have a ‘negative view of women entrepreneurs’.

A second strategy for overcoming perceived barriers in obtaining commercial finance is simply to avoid the need for external funding altogether (Kon and Storey, 2003; Hill et al., 2006; Treichel and Scott, 2006; Brooksbank et al., 2007; Wyer et al., 2007). Evans and Jovanovic (1989), for example, examine how financial constraints affect the self-employment decision, i.e. ‘he will choose to start a business if and only if his [sic] expected net income from doing so exceeds that from waged work’ (pp. 814-815). Other research also highlights the importance of liquidity constraints in the self-employment decision (e.g. Holtz-Eakin et al., 1994; Taylor, 1998; Burke et al., 2000), in some cases suggesting that such constraints are not a barrier to start-up (Cressy, 1996). On balance, the potential that perceived barriers to accessing finance could impact upon the start-up decision suggests our second Hypothesis:

Hypothesis 2: Financial Barriers and Start-up

All else being equal, individuals perceiving difficulties in obtaining finance for business start-up are less likely to be engaged in enterprise activities.

A number of studies, however, suggest that the start-up or self-employment decision may be very different for men and women, reflecting their alternative opportunities and preferences. Georgellis and Wall (2005), for example, found that: ‘capital constraints impose a major obstacle for men to become self-employed but not for women’ (p. 322). This was due partly to women’s higher valuation of the non-pecuniary or non-wage aspects of self-employment or enterprise, such as flexibility (Burke et al., 2002; Buttner and Moore, 2001; Clain, 2000; Beaucage et al., 2004)⁴. Leung (2006) also suggests that the gender pay gap may have a stronger influence on women choosing self-employment than men, although there is recognition that there may also be inequality in the returns to self-employment. Even once the start-up or self-employment decision is made, however, perceptions of difficulties in accessing external finance may lead to under-capitalisation (Orser et al., 2006; Constantinidis et al., 2006), and financial bootstrapping (Brush et al., 2006). Carter and Shaw (2006) and Carter et al. (2007) suggest that under-capitalisation may then have consequences in terms of the growth and longevity of women-owned firms (see also Verheul and Thurik, 2001). Following Georgellis and Wall (2005), we suggest:

Hypothesis 3: Gendered barriers to start-up

All else being equal, perceptions of difficulties in obtaining finance for business start-up among women are likely to have a smaller impact on start-up rates than those among men.

In summary, we therefore anticipate that while women are more likely to perceive financial barriers to start-up and, in general, those barriers will have a negative impact on start-up, the start-up effect for women will be weaker than that for men.

3. Data and Methods

⁴ This reflects the findings of Watson and Newby (2007) who identify variations in men and women’s entrepreneurial goals, with women being more focused upon ‘subjective’ goals, which may be intrinsic or related to ‘self-fulfilment’, whilst men’s are ‘objective’, i.e. financial.

Data for this study are taken from the UK Global Entrepreneurship Monitor Survey, 2004. This follows the standard GEM survey methodology, i.e. a telephone survey of the adult population of the UK. The 2004 GEM survey includes responses from around 22,000 individuals with a weighting structure designed to allow nationally representative results to be constructed. The GEM survey provides detailed data on individuals' involvement in different aspects of enterprise activity as well as their background characteristics, location and experience. In addition, and of central interest here, the GEM survey also provides information on individuals' perceptions regarding the availability of business finance. In this sense, the coverage of the GEM database makes it valuable in considering the relationship between individuals' perceptions of difficulties in accessing finance and their engagement in business start-up. Of course, the survey remains cross-sectional – suggesting potential difficulties with the direction of causality and capturing the timing of what are inevitably dynamic linkages. The cross-sectional nature of the survey also means that it will inevitably reflect economic conditions at the time it was conducted (i.e. June to October 2004). At this time, the international economic climate was marked by uncertainty, with some OECD countries (e.g. France and Germany) experiencing net reductions in gross domestic product (GDP). In the UK, the situation was more stable with continued – albeit slower – economic growth providing perhaps a more benign environment for business start-up than in some other countries.

A detailed analysis and description of the 2004 GEM data is provided in Harding (2004). It is, perhaps, worth recalling some of the key descriptive statistics here to set the scene for our subsequent model development. The key indicator in the GEM survey is the Total Entrepreneurial Activity or TEA measure. This is the proportion of the 18-64 year old population either actively engaged in creating a new business or involved in running a business less than 42 months old. In 2004, the UK TEA rate was 6.3 per cent, similar to its level in 2003, but below levels in North America and above those in major continental European countries. Entrepreneurial activity in the UK is dominated by 'opportunity' rather than 'necessity', and varied significantly by age group, educational level, prior employment status and household income. Relatively large regional variations were also evident in TEA rates between UK regions in the 2004 survey with higher TEA rates generally recorded in Southern regions of the UK and lower TEA rates in central and Northern regions and the

devolved territories (i.e. Scotland, Wales and Northern Ireland)⁵. These variations emphasize the importance of a multivariate approach to modelling the relationship between perceptions of financial barriers and start-up which can control for the potential impact of age, education, location, etc.

The focus of our empirical work here is on two variables collected as part of the 2004 GEM survey. The first relates to the perceived financial barriers to business start-up and is based on the responses to a question posed to all respondents, ‘Excluding money from family and friends, would a lack of external funding prevent you from starting up a business?’ While this question provides a fairly straightforward indication of the perceived difficulty of obtaining commercial start-up finance, one might question the actual importance of commercial finance (i.e. non family and friends) in the start-up process⁶. Fraser (2005), for example, reports that while around 80 per cent of UK SMEs accessed commercial finance in the previous three years, the main sources of finance for start-ups were personal savings (65 per cent), bank loan (10 per cent) and friends/family loan (6 per cent)⁷. The question here, however, is not the actual difficulty encountered in obtaining external finance, rather, the question is one of perception and whether perceived difficulties in obtaining external finance are likely to act as a deterrent to subsequent start-up. The key focus of our empirical analysis is whether, when individuals indicated that they did actually perceive these difficulties, this actually translated into lower start-up rates. In the 2004 GEM survey, a significantly higher proportion of women (64 per cent) suggested that they did perceive a lack of external funding for business start-up compared to males (57 per cent, Table 1).

TABLE 1 HERE

Our second main variable of interest reflects individuals’ participation in business start-up activity. The specific question asked is as follows: ‘Are you, alone or with others, currently trying to start a new business, including any type of self-employment or selling any goods or services to others?’. In the GEM data the proportion of women engaged in business start-up activity was significantly lower than that of male respondents (Table 1). This reflects the

⁵ In some regions sample sizes were relatively small (around 1,000) suggesting around 60-100 ‘positive’ TEA responses. In these regions (London, East of England, North East, South East, South West and the West Midlands), significant year on year variation in TEA rates was observed (Harding, 2004, Figure 5, p.27).

⁶ One might also question whether the focus of the question ‘external sources of finance’ is the same for men and women given that male and female business owners may use different sources of external funding. We are grateful to an anonymous referee for making this point.

⁷ This pattern, of course, reflects other studies which have suggested a pecking order of types of finance with entrepreneurs having a preference for their own resources and those of friends and families before seeking commercial finance (Hamilton and Fox, 1998; Howorth, 2001).

findings of Carter et al. (2001) and Carter and Shaw (2006) that the proportion of women starting businesses and engaged in business leadership is significantly lower than that of men (see also Martin et al., 2008). Simple correlations between perceptions of financial barriers and engagement in start-up activity are negative for all respondents (-0.0079) and men (-0.0094) but positive for women (0.0013), and are insignificant at the 5 per cent level in each case.

The GEM database also provides a number of indicators which can be used to control for other influences on start-up aside from perceptions of financial barriers⁸. Notably, a number of these variables also have significant mean differences between men and women (Table 1). For example, a significantly higher proportion of male respondents have university degrees, while school-level qualifications such as ‘A’ levels and GCSEs are significantly more common as the highest qualifications among women. Women respondents were also significantly more likely to be in a lower quartile of the national distribution of household income than male respondents. In terms of labour market status, male respondents were significantly more likely to be working full-time and to have received enterprise training or participated in work experience programmes. The one exception here is respondents’ experience of school based enterprise education where no significant difference is evident between male and female respondents. The suggestion is that male respondents to the GEM survey were more likely to be highly qualified; more likely to have a stronger financial profile (i.e. are in the upper quartiles of the distribution of household incomes); and to have benefited from relevant working and training experiences than female respondents. Previous research suggests that each of these factors is likely to be positively associated with business start-up, aside from any underlying gender differences emphasising the importance of a multivariate approach.

TABLE 2 HERE

In our modelling we seek to identify what determines individuals’ probability of perceiving barriers to obtaining finance for business start-up, and then to ascertain the impact of these perceptions on start-up activity itself. We can express the probability that individual i will perceive barriers to obtaining finance for business start-up ($FBarr_i^*$) as follows:

⁸ Our choice of control variables here is suggested largely by the descriptive characteristics of the GEM data highlighted in Harding (2004). This suggested important differences in start-up rates between individuals of different age, education, household income, ethnicity, region and labour market status.

$$FBarr_i^* = \beta_0 + \beta_1 Gend_i + \beta_2 Pchar_i + \varepsilon_i$$

Where $Gend_i$ is an indicator taking value 1 if the individual is female and 0 otherwise, $Pchar_i$ is vector of other personal characteristics (i.e. control variables) and ε_i is a normally distributed error. What we observe is not the latent variable $FBarr_i^*$, however, but whether or not an individual actually perceives financial barriers to start-up ($FBarr_i$). That is,

$$FBarr_i = 1 \text{ if } FBarr_i^* > 0,$$

$$FBarr_i = 0 \text{ if } FBarr_i^* \leq 0.$$

This suggests $\Pr(FBarr_i = 1) = \beta_0 + \beta_1 Gend_i + \beta_2 Pchar_i$, which can be modeled by a simple Probit model.

The second stage of our modelling approach explores the link between individuals' perceptions of financial barriers to start-up ($FBarr_i^*$) and their engagement in enterprise ($BStart_i^*$). A priori, we consider it possible, however, that the perception of financial barriers to start-up and the start-up decision may be related and, therefore, use a Bivariate Probit model to model this potentially simultaneous data generation process. In other words, we consider a model in which there are two latent variables – financial barriers and enterprise engagement, i.e.

$$FBarr_i^* = \beta_0 + \beta_1 Gend_i + \beta_2 Pchar_i + \varepsilon_{1i},$$

$$BStart_i^* = \gamma_0 + \gamma_1 Gend_i + \gamma_1 FBarr_i + \gamma_2 Pchar_i + \varepsilon_{2i}$$

and where we anticipate the possibility that $\text{cov}(\varepsilon_{1i} \varepsilon_{2i}) = \sigma_{12}$. If empirically, $\text{cov}(\varepsilon_{1i} \varepsilon_{2i}) = 0$, this suggests that the perception of financial barriers and the start-up decision can be modelled separately. In each of the models we also include a set of regional dummy variables (not reported) designed to control for the regional variations in enterprise activity identified in Harding (2004).

4. Perceived barriers to obtaining finance for business start-up

Our main aim in this section is to explore Hypothesis 1, i.e. to see whether, controlling for individuals' background characteristics, gender influences the likelihood that individuals

perceive financial barriers to business start-up. In Table 3 we report Probit models of the probability of perceiving financial barriers to business start-up excluding (Model 1) and including (Model 2) an ethnicity measure. In addition to the variables reported, both models also include a constant term and full set of regional dummies designed to control for regional variations in economic conditions and start-up rates (Harding, 2004). Sample sizes in both models are smaller than the aggregate sample suggested in Table 1 due to missing responses.

TABLE 3 HERE

In terms of the impact of gender on individuals' perception of financial barriers, our results here are straightforward, consistent and statistically robust. Even adjusting for a range of background characteristics, being female significantly increases the probability that an individual will perceive financial barriers to business start-up by around 7.4 percentage points. This result proves robust to the inclusion in the model of the ethnicity indicator, with the ethnicity variable itself suggesting that members of ethnic minority populations are actually less likely than others to perceive financial barriers to business start-up. Our core result here adds weight to previous studies which have suggested that *ceteris paribus* women face, or at least perceive that they face, greater financial constraints than men (Carter and Rosa, 1998; Carter and Shaw, 2006). The GEM data provide little by way of insight into why this difference in perceptions between men and women actually arises but, as Carter et al. (2001) suggest, these may stem from any combination of problems related to collateral, networks, discrimination or financing preferences.

Our analysis also suggests a number of other factors aside from gender which prove important in determining the probability that an individual will perceive financial barriers to business start-up. First, as indicated earlier, and contrary to expectations, membership of an ethnic minority population actually reduces the likelihood that an individual will perceive financial barriers to start-up by around 4.4 percentage points (pp). This runs contrary to the analysis of Fraser (2007), for example, which suggested that ethnicity was a more important determinant of whether individuals were discouraged borrowers than gender. There is also little evidence in our data of any significant connection between the gender and ethnicity effects. An interaction term included in Model 2, Table 3, for example, is negative and insignificant ($df/dx=-0.040$, $t\text{-stat}=-0.78$) and has little impact on any other coefficient. Second, individuals in households with income in higher quartiles were significantly less likely to perceive financial barriers to start-up than those in households in the lowest income quartile. For example, individuals in households in the top quartile of the distribution of household

incomes were 12 percentage points less likely, for example, to perceive financial barriers than those in the lowest quartile. This may reflect the points made earlier linking the availability of collateral (Carter and Shaw, 2001) or previous incomes (Leung, 2006) to individuals' ability to access commercial finance. Older individuals were also less likely to perceive financial barriers to business start-up, as were those working either part time or not working (relative to working full-time). Finally, work experience at either college or university is also linked to a reduced perception of financial barriers to start-up⁹. Two explanations for this effect are possible. First, this could reflect a credibility effect with work experience giving individuals a sense that they would be more credible lending prospects, helping perhaps to counter the negative perception of women entrepreneurs identified by Hill et al. (2006). Conversely, it could be that work experience is boosting individuals' confidence in their ability to successfully obtain business finance.

In summary, the UK GEM 2004 data provide strong support for Hypothesis 1, that *ceteris paribus*, women in the UK are more likely to perceive financial barriers to business start-up than men. Other factors also prove important, however, suggesting that perceptions of financial barriers to start-up will be most common among younger women in low income households who are working full-time. Perceived financial barriers to start-up are significantly less common among older males from high income households in ethnic minority communities, particularly where these individuals are working only part-time. In the next section we explore the implications of these results for the start-up decision.

5. Effects on Business Start-up

The aim of this section is to explore Hypotheses 2 and 3, i.e. to investigate the role of perceived financial barriers on business start-up, both in general and by gender. Two scenarios are possible here. First, if perceived financial barriers to business start-up are important in influencing business start-up, then our earlier evidence that perceived financial barriers to business start-up are concentrated among women may be contributing to lower start-up rates among women. If, however, perceived financial barriers to business start-up are not a factor in shaping business start-up, then differential perceptions between genders will be less important in explaining lower start-up rates among women (e.g. Table 1).

⁹ Again, there is only a weak 'gender' dimension to this effect, with interaction terms (not reported) proving wholly insignificant.

Identifying the impact of perceived financial barriers on business start-up raises some classic econometric and statistical issues. In particular, the obvious approach is to estimate a model for business start-up and include a dummy variable which takes value 1 if an individual perceives financial barriers to business start-up. The coefficient on this ‘treatment’ term would then suggest the significance of perceived financial barriers on the business start-up decision. In fact, however, unless perceived financial barriers to business start-up are randomly distributed across the population – and the evidence of Table 2 suggests they are not – this approach will yield potentially biased estimates of the importance of perceived financial barriers (see Maddala, 1973, pp. 257-290 for a general discussion of this issue). Instead, an approach is needed which allows for any connection between the factors determining perceived financial barriers to business start-up and business start-up. This is simply dealt with using a bivariate probit model which simultaneously estimates the probability that an individual perceives financial barriers to start-up and start-up itself (Table 3). Initially, our focus here is on the error correlation coefficient; if this is significant, it suggests the need to simultaneously examine the determinants of perceived financial barriers and business start-up. If this is not significant, it suggests the validity of estimating single equation probit models for business start-up, including the perception of financial barriers as a simple independent variable. Table 3 reports bivariate probit models including (Model 1) and excluding (Model 2) the ethnicity indicator. In each case, the error correlation is insignificant, suggesting the validity of examining business start-up using single equation probit models for the probability of business start-up, and these are given in Table 4. Here, we report three models including and excluding the ethnicity indicator and, in Model 3, including an interaction term for the female and perceptions of financial barriers variables.

TABLE 4 HERE

We find some support here for Hypothesis 2, the general impact of perceptions of financial difficulties on business start-up. In each of the models of business start-up perceptions of financial barriers are associated with a reduction in start-up probability of 1.2-1.5 percentage points, although these effects are of only marginal statistical significance (Table 4). This result provides some support for the potential impact of discouragement (Kon and Storey, 2003) on start-up rates and others who have argued more generally that difficulties in accessing external finance may discourage start-up (Holtz-Eakin et al., 1994; Taylor 1998; Burke et al., 2000; Hill et al., 2006). More specifically, following Georgellis and Wall (2005), we suggest in Hypothesis 3 that perceptions of financial barriers to start-up may be less important for women than men. The interaction effect included in Model 3 in Table 4

addresses this point and proves positive but insignificant. In other words, we find no evidence of any ‘gender’ effect in terms of perceptions of funding difficulties which seem to influence male and female start-up rates in the same way. This reflects the earlier findings of Freel (2007) in terms of the effect of gender on the discouraged borrower effects, but provides little support for the gendered effect of financial barriers to self-employment suggested by Georgellis and Wall (2005) and Leung (2006)¹⁰.

In addition to perceptions of financial difficulties, a number of other factors also prove significant in explaining start-up. Those working part-time or not-working, for example, are more likely to be involved in start-up activity than those working full-time, perhaps reflecting the relative balance of labour market opportunities for those in each situation (Table 4). Similarly, we find that work experience at college or university is also likely to have a positive effect on start-up probability. Other forms of enterprise experience – age, household income and education – all prove surprisingly weak influences on start-up. More interesting are the more significant gender and ethnicity effects. Over and above the effects of an individual’s background characteristics, being female still reduces business start-up probability by around 1.7-2.3 pp, while membership of an ethnic minority group has the opposite effect, increasing start-up probability by 2.9 pp. Taken together, these effects suggest that negative gender impacts on start-up in the UK are both direct and indirect, with the indirect effects operating through perceived financial barriers to start-up. Women are more likely to perceive financial barriers to start-up and these are likely to reduce start-up rates (Hisrich and Brush, 1986; Ennew and McKechnie, 1998; Carter et al., 2007). In addition, there remains a direct negative gender effect on start-up rates, even allowing for education, locational and personal characteristics.

6. Concluding remarks

The UK GEM 2004 data suggest that in the UK women were 7.4 percentage points more likely to perceive financial barriers to business start-up than men. As perceived financial barriers are also linked negatively to start-up rates, this gap in perceptions will have a disproportionately negative effect on women’s start-up rates. In addition to this finance effect, being female also has an additional direct effect on start-up over and above the effects of

¹⁰ Interestingly, we also find no support for a link between ethnicity and financial barriers to start-up, with any interaction effect here also being insignificant (marginal value = -0.0123026, t-stat = -0.88).

education, household income, etc. Other factors, of course, also influence individual's perception of financial barriers and the probability of start-up, with perceptions of financial barriers being most common among younger women in low income households who are working full-time. Start-up probability is likewise influenced by individuals' working patterns and prior work experience at college or university.

Our results provide support for the general message in the entrepreneurial literature that women may face – or perceive – greater barriers to business start-up than males (e.g. Warren-Smith and Jackson, 2004). We find no evidence, however, that any given level of perception of financial barriers to start-up is likely to have a more significant effect on start-up among women than men (Table 5). This suggests that a key policy focus here should be on trying to counter the more negative perceptions of potential women entrepreneurs.

Our data provide limited insights, however, into why women have more negative perceptions of their ability to source external finance, particularly given the general evidence that women's businesses tend to be in sectors where capital requirements are low (Martin et al., 2008). Hill et al. (2006) for example, suggest that women's more negative perception might be linked to a view that bankers regard women entrepreneurs as less credible. Others have argued that women's past experience of seeking finance – or of personal banking – may discourage them from seeking further finance (Kon and Storey, 2003). In either case, measures designed to increase the confidence of aspiring women entrepreneurs potentially play a key role. In the UK, for example, the Opening Doors project run by Women in Rural Enterprise (WiRE) provides a range of activities to help 'women in business gain the confidence, knowledge, support and skills they need to start up their own business'¹¹. Our study also suggests the potential value for both men and women of work experience at university or college in reducing the likelihood that individuals will perceive financial barriers to business start-up (Table 2). Again, this might be interpreted as a 'confidence' effect. Interestingly, we find no such effect from enterprise training or work experience undertaken at school.

While our study provides some new insights into the role of perceptions of financial barriers on the start-up decision, there remains a significant and essentially unexplained difference in

¹¹See: <http://www.wireuk.org/openingdoors/> accessed on 16th June 2008.

start-up rates between men and women. This is reflected in the ‘female’ dummy variable in our start-up models, a variable which remains stubbornly significant and accounts for around 1.7-2.3 percentage points of the difference between male and female start-up rates. Perhaps the most likely explanation here is the omission from the models of variables which are disproportionately linked to women. Aspects of household or family responsibility are perhaps the most obvious candidates (Jennings and McDougald, 2007). Our study also has nothing to say about the quality of the start-up companies in which women and men are engaging. Recent studies, for example, have questioned the emphasis of UK small business policy on start-up regardless of issues of under-capitalisation in many women-led start-ups (Marlow and Watson, 2006).

A number of potential directions for future research are suggested. First, it remains important to understand why women’s perceptions of financial barriers are different to those of males with essentially similar characteristics. From a policy development standpoint, this understanding will be important in designing effective intervention to reduce the disproportionate difficulty which women continue to face in business start-up. Secondly, as indicated earlier, our models still contain an unexplained ‘gender’ element, and there is a need to identify variables which can capture this, and provide a clearer understanding of the start-up decision. Finally, perceptions of financial barriers might have a range of different effects on start-up behaviour, changing individuals’ choice of business, their initial scale and/or the timing of their start-up. GEM is a rich data source but its cross-sectional structure makes it difficult to capture these more dynamic effects. In this sense, more longitudinal data – such as the Kauffman Panel Study on Entrepreneurial Dynamics – would be useful in tracking individuals from pre-start-up perceptions through the start-up decision process.

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Table 1: Descriptive Data

	Females			Males			Test for mean
	n	Mean	Std. Dev.	n	Mean	Std. Dev.	difference
Finance Barriers and Start-up Indicators							
Perceived financial barriers to start-up	10597	0.641	0.480	7674	0.574	0.495	t=-9.92, p<0.000
Involved in business start-up	10847	0.031	0.174	7835	0.059	0.236	t=8.71, p<0.000
Ethnic Minority Group	10849	0.166	0.372	7840	0.161	0.368	t= -0.276, p<0.782
Highest Educational Level							
Degree or higher	10511	0.316	0.465	7577	0.367	0.482	t= 6.88, p<0.000
‘A’ Levels	10511	0.224	0.417	7577	0.204	0.403	t= -2.47, p=0.013
GCSE or equivalent	10511	0.257	0.437	7577	0.228	0.419	t=-7.17, p<0.000
Other vocational qualifications	10511	0.091	0.288	7577	0.088	0.284	t= 5.49, p<0.000
No formal qualifications	10511	0.112	0.315	7577	0.113	0.316	t=-1.65, p<0.097
National Household Income Distribution							
Lower quartile	8400	0.205	0.404	6515	0.140	0.347	t=-11.53, p<0.000
2nd quartile	8400	0.253	0.435	6515	0.248	0.432	t=0.82, p=0.409
3rd quartile	8400	0.246	0.431	6515	0.281	0.450	t= 4.51, p<0.000
4th quartile	8400	0.295	0.456	6515	0.331	0.471	t=6.39, p<0.000
Age							
Age in years	10849	40.539	12.734	7840	40.257	12.815	t= 4.27, p<0.000
Working Status							
Full-time (30 or more hours)	10615	0.464	0.499	7672	0.786	0.410	t=35.53, p<0.000
Part-time (8-29 hours)	10615	0.253	0.435	7672	0.062	0.241	t=-39.54, p<0.000
Not working (8 or less hours)	10615	0.283	0.450	7672	0.152	0.359	t=-11.54, p<0.000
Enterprise Training and Work Experience							
Enterprise training at school	10819	0.114	0.318	7824	0.137	0.344	t=3.30, p<0.000
Enterprise training at college/university	10831	0.158	0.365	7833	0.214	0.410	t=9.39, p<0.000
Work experience at school	10822	0.341	0.474	7828	0.350	0.477	t=1.44, p<0.148
Work experience at college/university	10821	0.120	0.325	7825	0.140	0.347	t= 5.22, p<0.000

Notes: Survey responses are weighted to give representative results.

Source: GEM 2004

Table 2: Probit Models of Perceived Financial Barriers to Business Start-up

	Model 1		Model 2	
	dy/dx	t-stat	dy/dx	t-stat
Female	0.074	4.44	0.073	4.42
Control Variables				
Ethnic minority			-0.044	-1.72
Degree or higher	0.039	1.22	0.043	1.36
‘A’ Levels	-0.028	-0.86	-0.025	-0.76
GCSE or equivalent	0.012	0.4	0.012	0.41
Other vocational qualifications	0.046	1.24	0.046	1.26
2nd quartile	-0.056	-2.1	-0.059	-2.22
3rd quartile	-0.041	-1.51	-0.045	-1.64
4th quartile	-0.120	-4.22	-0.125	-4.38
Age in years	-0.006	-7.63	-0.006	-7.77
Part-time (8-29 hours)	-0.042	-1.81	-0.041	-1.76
Not working (8 or less hours)	-0.054	-2.27	-0.053	-2.24
Enterprise training at school	0.021	0.76	0.022	0.81
Enterprise training at college/university	-0.011	-0.5	-0.009	-0.38
Work experience at school	0.024	1.26	0.023	1.21
Work experience at college/university	-0.058	-2.36	-0.058	-2.35
No of observations	13878		13878	
Chi Square	168.39		171.88	
Log Likelihood	-8906.39		-8900.18	
Pseudo R ²	0.033		0.0337	

Notes: Marginal values suggest the increase in the probability of perceiving finance shortages when moving from dummy variable values of 0 to 1. Marginal values for the age variable are at variable means. Sample observations are weighted. Reference categories are: No post-school qualifications, the lowest household income quartile, and that the individual was working full-time. Both models included a constant and full set of regional dummy variables (not reported).

Source: GEM 2004

Table 3: Bivariate Probit Models of Shortage of Start-up Finance and Start-up

	Model 1		Model 2	
	Coeff.	t-stat	Coeff.	t-stat
Part A: Business Start-up				
Female	-0.247	-3.01	-0.235	-2.86
Ethnic minority	0.324	2.67		
Degree or higher	0.007	0.03	0.060	0.28
'A' Levels	0.002	0.01	0.046	0.20
GCSE or equivalent	0.016	0.07	0.043	0.20
Other vocational qualifications	0.000	0.00	0.009	0.04
2nd quartile	-0.031	-0.21	-0.063	-0.42
3rd quartile	-0.007	-0.05	-0.053	-0.35
4th quartile	-0.057	-0.38	-0.116	-0.76
Age in years	0.000	-0.01	-0.001	-0.21
Part-time (8-29 hours)	0.802	6.89	0.791	6.85
Not working (8 or less hours)	0.545	3.49	0.563	3.67
Enterprise training at school	-0.011	-0.08	0.003	0.02
Enterprise training at college/university	0.148	1.23	0.165	1.39
Work experience at school	-0.121	-1.15	-0.126	-1.21
Work experience at college/university	0.401	3.40	0.392	3.32
Constant	-1.825	-4.67	-1.764	-4.80
Part B: Perceived Financial Barriers				
Female	0.186	3.96	0.185	3.93
Ethnic minority	-0.157	-2.07		
Degree or higher	0.101	1.00	0.081	0.80
'A' Levels	-0.050	-0.48	-0.065	-0.62
GCSE or equivalent	0.054	0.55	0.048	0.48
Other vocational qualifications	0.117	0.99	0.112	0.95
2nd quartile	-0.101	-1.15	-0.091	-1.04
3rd quartile	-0.035	-0.40	-0.022	-0.25
4th quartile	-0.240	-2.69	-0.220	-2.46
Age in years	-0.017	-7.19	-0.017	-7.03
Part-time (8-29 hours)	-0.184	-2.17	-0.180	-2.15
Not working (8 or less hours)	-0.078	-0.73	-0.086	-0.81
Enterprise training at school	0.028	0.35	0.025	0.30
Enterprise training at college/university	-0.063	-0.95	-0.071	-1.07
Work experience at school	0.026	0.47	0.030	0.53
Work experience at college/university	-0.142	-2.03	-0.143	-2.03
Constant	1.059	6.37	1.033	6.23
Part C: Error Correlation	-0.14512	-1.08	-0.14486	-1.39
Observations	10921		10921	
Equation Chi-Square (.)	264.94		244.91	
Log Likelihood	-9586.76		-9610.84	
Wald test for zero error correlation	1.16696		1.92275	
Significance of error correlation test	0.28		0.1656	

Notes: Sample observations are weighted. Reference categories are: No post-school qualifications, the lowest household income quartile, and that the individual was working full-time. Both models included a full set of regional dummy variables (not reported).

Source: GEM 2004

Table 4: Probit Models of Business Start-up Indicators

	Model 1		Model 2		Model 3	
	dy/dx	t-stat	dy/dx	t-stat	dy/dx	t-stat
Perceptions of funding difficulties	-0.013	-1.78	-0.012	-1.66	-0.015	-1.64
Female	-0.017	-2.65	-0.017	-2.81	-0.023	-2.45
Interaction: Perceptions x Female					0.011	0.83
Control Variables						
Ethnic minority			0.029	2.56	0.029	2.59
Degree or higher	0.005	0.31	0.001	0.07	0.001	0.08
‘A’ Levels	0.003	0.18	0.000	-0.01	0.000	0.00
GCSE or equivalent	0.004	0.22	0.002	0.09	0.002	0.11
Other vocational qualifications	0.001	0.08	0.001	0.04	0.001	0.03
2nd quartile	-0.005	-0.47	-0.003	-0.27	-0.003	-0.28
3rd quartile	-0.004	-0.37	-0.001	-0.07	-0.001	-0.09
4th quartile	-0.010	-0.89	-0.006	-0.53	-0.006	-0.54
Age in years	0.000	-0.56	0.000	-0.36	0.000	-0.38
Part-time (8-29 hours)	0.105	6.73	0.105	6.79	0.106	6.82
Not working (8 or less hours)	0.067	3.63	0.063	3.45	0.063	3.45
Enterprise training at school	0.000	0.04	-0.001	-0.06	-0.001	-0.09
Enterprise training at college/university	0.013	1.35	0.012	1.19	0.012	1.21
Work experience at school	-0.009	-1.19	-0.009	-1.13	-0.009	-1.17
Work experience at college/university	0.038	3.19	0.038	3.25	0.039	3.31
No of observations	10921		10921		10921	
Chi Square	118.31		133.62		139.55	
Log Likelihood	-1838.65		-1825.46		-1824.39	
Pseudo R ²	0.0924		0.0989		0.0994	

Notes: Marginal values suggest the increase in the probability of business start-up when moving from dummy variable values of 0 to 1. Marginal values for the age variable are at variable means. Sample observations are weighted. Reference categories are: No post-school qualifications, the lowest household income quartile, and that the individual was working full-time. Both models included a constant and full set of regional dummy variables (not reported).

Source: GEM 2004

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